

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently amended) A method for ~~cleaning a plasma etching apparatus~~  
manufacturing a semiconductor device, the method comprising the steps of:  
forming a semiconductor film over a substrate;  
forming a conductive film over the semiconductor film;  
cleaning a chamber, the cleaning including:  
filling a chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas wherein  
BO<sub>x</sub> is adhered to an inside of the chamber as a residue; and  
generating plasma from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas  
to remove the BO<sub>x</sub>;  
placing the substrate with the conductive film and the semiconductor film in the cleaned  
chamber; and  
etching the conductive film in the cleaned chamber.
2. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according~~  
~~to~~ of claim 1, wherein etching includes etching using a method selected from the group  
consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon  
wave etching method, a helical resonance etching method and a pulse modulation etching  
method ~~is adopted in the plasma etching apparatus.~~
3. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according~~  
~~to~~ of claim 1, wherein the fluorine-based gas is selected from the group consisting of CF<sub>4</sub>, SF<sub>6</sub>  
and NF<sub>3</sub>.

4. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to of claim 2 1, wherein the fluorine-based gas is selected from the group consisting of CF<sub>4</sub>, SF<sub>6</sub> and NF<sub>3</sub>~~ further comprising interposing a gate insulating film between the semiconductor film and the conductive film.

5. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to of claim 1, wherein an etching gas is replaced~~ cleaning includes replacing an etching gas within the chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub>.

6. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to of claim 2 1, wherein an etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub>~~ cleaning includes removing BO<sub>x</sub> from an inner surface of the chamber.

7. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to of claim 3 1, wherein an etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub>~~ forming the semiconductor film over the substrate includes forming an island shaped semiconductor film over the substrate.

8. (Currently amended) A ~~method for cleaning a plasma etching apparatus~~ manufacturing a semiconductor device, the method comprising the steps of:

placing a substrate having a first conductive film and a second conductive film over the first conductive film within a chamber;

~~performing plasma etching using a gas containing  $\text{BCl}_3$  as an etching gas in a~~ the first and the second conductive film within the chamber using an etching gas;

~~cleaning the chamber replacing the etching gas in the chamber with a plasma generated from  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas after the plasma etching~~ second conductive film has been etched; and

~~generating plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine based gas etching the second conductive film within the cleaned chamber.~~

9. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 8, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method ~~is adopted in the plasma etching apparatus.~~

10. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 8, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

11. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 9, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  at least one of the conductive films includes W.

12. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 8, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

13. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 9, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  further comprising placing a dummy substrate in the chamber during cleaning.

14. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 10, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  cleaning the chamber includes removing  $\text{BO}_x$  from an inner surface of the chamber.

15. (Currently amended) A ~~method for cleaning a plasma etching apparatus~~ manufacturing a semiconductor device, the method comprising the steps of:  
placing a substrate having at least a conductive film including W within a chamber;  
~~performing plasma etching using a gas containing  $\text{BCl}_3$  as an etching gas in a chamber;~~  
~~replacing the etching gas in the chamber with a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas or  $\text{Cl}_2$  after the plasma etching; and~~  
cleaning the chamber with a generating plasma generated from the a mixed gas of  $\text{Cl}_2$  and the a fluorine-based gas or the  $\text{Cl}_2$  before a plasma etching using a gas that is inhibited from generating plasma by  $\text{BO}_x$  as an etching gas; and  
etching the conductive film within the cleaned chamber.

16. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 15, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

17. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 15, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

18. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 16 ~~15~~, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate in the chamber during cleaning.

19. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 15, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and cleaning the chamber includes generating the plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

20. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 16 ~~15~~, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  cleaning the chamber includes removing  $\text{BO}_x$  from an inner surface of the chamber.

21. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 17, wherein the etching the conductive film includes etching the conductive film with gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and a plasma is generated from a mixture of the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{SF}_6$ , and  $\text{O}_2$ .

22. (Currently amended) A method for ~~cleaning a plasma etching apparatus~~  
manufacturing a semiconductor device, the method comprising the steps of:

forming an insulating film over a substrate;

forming a conductive film over the insulating film;

~~performing plasma etching using a gas containing BCl<sub>3</sub> as an etching gas in a chamber;~~

~~replacing the etching gas in the chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas after the plasma etching; and~~

cleaning a chamber with a generating plasma generated from the Cl<sub>2</sub> or the a mixed gas of Cl<sub>2</sub> and the a fluorine-based gas before performing plasma etching using a gas containing SF<sub>6</sub> as an etching gas;

placing the substrate with the conductive film and the insulating film into the cleaned chamber; and

etching the conductive film in the cleaned chamber.

23. (Currently amended) A The method for cleaning a plasma etching apparatus  
~~according to~~ of claim 22, wherein a method cleaning includes etching the chamber using an  
etching method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

24. (Currently amended) A The method for cleaning a plasma etching apparatus  
~~according to~~ of claim 22, wherein the fluorine-based gas is selected from the group consisting of  
CF<sub>4</sub>, SF<sub>6</sub> and NF<sub>3</sub>.

25. (Currently amended) A The method for cleaning a plasma etching apparatus  
~~according to~~ of claim 23 22, wherein the fluorine-based gas is selected from the group consisting  
~~of CF<sub>4</sub>, SF<sub>6</sub> and NF<sub>3</sub>~~ further comprising forming a semiconductor film over the substrate and  
forming the insulating film over the semiconductor film.

26. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 22, wherein ~~the etching gas is replaced~~ cleaning includes replacing an  
etching gas within the chamber with the  $\text{Cl}_2$  or a the mixed gas of  $\text{Cl}_2$  and a the fluorine-based  
gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$   
and the fluorine-based gas each of which is added with  $\text{O}_2$ .

27. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 23 22, wherein ~~the etching gas is replaced~~ cleaning includes replacing an  
etching gas within the chamber with the  $\text{Cl}_2$  or a the mixed gas of  $\text{Cl}_2$  and a the fluorine-based  
gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$   
and the fluorine-based gas each of which is added with  $\text{O}_2$ .

28. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 24 22, wherein ~~the etching gas is replaced with~~  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$   
and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or  
the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  wherein forming  
the insulating film includes forming a gate insulating film over the substrate.

29. (Currently amended) A method for cleaning a plasma etching apparatus including a  
chamber, said method comprising ~~the steps of~~:

filling the chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas; and  
generating plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas,  
wherein;

a part of the chamber is made from quartz, and

a surface of the quartz is at least partly exposed to an inside of the chamber,

generating the plasma includes applying a dielectric magnetic field generated  
from the electrode through the quartz adjacent the electrode;

wherein  $\text{BO}_x$  is adhered to the surface of the quartz at least partly exposed to the inside of the chamber as a residue.

30. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 29, further comprising etching the inside of the chamber with the generated plasma, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method ~~is adopted in the plasma etching apparatus.~~

31. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 29, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

32. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 30 29, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate on a stage within the chamber while the chamber is being cleaned.

33. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~ according to of claim 29, wherein:

filling the chamber with  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas includes filling the chamber an etching gas is replaced with the  $\text{Cl}_2$  or a the mixed gas of  $\text{Cl}_2$  and a the fluorine-based gas each of which is added with and adding  $\text{O}_2$  to the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas, and such that the plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas, each of which is and the added with  $\text{O}_2$ .



34. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of claim 30 32, wherein an etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub>~~  
~~and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or~~  
~~the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub>~~ the dummy  
substrate includes quartz.

35. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of claim 31 29, further comprising wherein an etching gas is replaced with Cl<sub>2</sub> or a~~  
~~mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is~~  
~~generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added~~  
~~with O<sub>2</sub>~~ the inside of the chamber with the generated plasma such that BO<sub>x</sub> is removed from an  
inner surface of the chamber.

36. (Currently amended) A method for cleaning a plasma etching apparatus including a  
chamber, said method comprising ~~the steps of:~~  
performing plasma etching using a gas containing BCl<sub>3</sub> as an etching gas in the chamber;  
replacing the etching gas in the chamber with a mixed gas of Cl<sub>2</sub> and a fluorine-based gas  
or Cl<sub>2</sub> after the plasma etching; and  
generating plasma from the mixed gas of Cl<sub>2</sub> and the fluorine-based gas or the Cl<sub>2</sub>,  
wherein:  
a part of the chamber is made from quartz, ~~and~~  
a surface of the quartz is at least partly exposed to an inside of the chamber,  
generating the plasma includes applying a dielectric magnetic field generated  
from the electrode through the quartz adjacent the electrode.

37. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of claim 36, further comprising etching the inside of the chamber with the generated~~  
plasma, wherein etching includes a method selected from the group consisting of an RIE etching

method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is ~~adopted in the plasma etching apparatus.~~

38. (Currently amended) ~~A~~ The method for cleaning a plasma etching apparatus according to ~~of~~ claim 36, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

39. (Currently amended) ~~A~~ The method for cleaning a plasma etching apparatus according to ~~of~~ claim 37 ~~36~~, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate on a stage within the chamber while the chamber is being cleaned.

40. (Currently amended) ~~A~~ The method for cleaning a plasma etching apparatus according to ~~of~~ claim 36, wherein:

filling the chamber with  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas includes filling the chamber the etching gas is replaced with the  $\text{Cl}_2$  or a the mixed gas of  $\text{Cl}_2$  and a the fluorine-based gas each of which is added with and adding  $\text{O}_2$  to the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas, and such that plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas, each of which is and the added with  $\text{O}_2$ .

41. (Currently amended) ~~A~~ The method for cleaning a plasma etching apparatus according to ~~of~~ claim 37 ~~39~~, wherein the ~~etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$~~  dummy substrate includes quartz.

42. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of claim 38 36, wherein the further comprising etching gas is replaced with Cl<sub>2</sub> or a~~  
~~mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is~~  
~~generated from Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added~~  
~~with O<sub>2</sub> the inside of the chamber with the generated plasma such that BO<sub>x</sub> is removed from the~~  
inside of the chamber.

43. (Currently amended) A method for cleaning a plasma etching apparatus including a  
chamber, said method comprising ~~the steps of:~~  
performing plasma etching using a gas containing BCl<sub>3</sub> as an etching gas in the chamber;  
replacing the etching gas in the chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-  
based gas after the plasma etching; and  
generating plasma from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas before  
performing plasma etching using a gas that is inhibited from generating plasma by BO<sub>x</sub> as an  
etching gas,  
wherein:  
a part of the chamber is made from quartz, ~~and~~  
a surface of the quartz is at least partly exposed to an inside of the chamber, ~~and~~  
generating the plasma includes applying a dielectric magnetic field generated  
from the electrode through the quartz plate adjacent the electrode.

44. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of claim 43, further comprising etching the inside of the chamber with the generated~~  
plasma, wherein etching includes a method selected from the group consisting of an RIE etching  
method, an ICP etching method, an ECR etching method, a helicon wave etching method, a  
helical resonance etching method and a pulse modulation etching method ~~is adopted in the~~  
~~plasma etching apparatus.~~

45. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 43, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

46. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 44 ~~43~~, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate on a stage within the chamber while the chamber is being cleaned.

47. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 43, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

48. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 44 ~~46~~, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  dummy substrate includes quartz.

49. (Currently amended) A ~~The method for cleaning a plasma etching apparatus according to~~ of claim 45 ~~43~~, wherein the further comprising etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  the inside of the chamber with the generated plasma such that  $\text{BO}_x$  is removed from the inside of the chamber.

50. (Currently amended) A method for cleaning a plasma etching apparatus including a chamber, said method comprising ~~the steps of:~~  
performing plasma etching using a gas containing  $\text{BCl}_3$  as an etching gas in the chamber;  
replacing the etching gas in the chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas after the plasma etching; and  
generating plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas before performing plasma etching using a gas containing  $\text{SF}_6$  as an etching gas,  
wherein:  
a part of the chamber is made from quartz, ~~and~~  
a surface of the quartz is at least partly exposed to an inside of the chamber, ~~and~~  
generating the plasma includes applying a dielectric magnetic field generated from the electrode through the quartz adjacent the electrode.

51. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 50, further comprising etching the inside of the chamber with the generated plasma, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method ~~is adopted in the plasma etching apparatus.~~

52. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 50, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

53. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to~~ of claim 51-50, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate within the chamber while the chamber is being cleaned.

54. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of~~ claim 50, wherein:

~~replacing the etching gas is replaced~~ includes replacing the etching gas with  $\text{Cl}_2$  or a  
mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and

~~generating the plasma is generated~~ includes generating the plasma from the  $\text{Cl}_2$  or the  
mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

55. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of~~ claim 51 ~~53~~, wherein ~~the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$~~   
~~and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or~~  
~~the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$~~  dummy substrate  
includes quartz.

56. (Currently amended) A ~~The method for cleaning a plasma etching apparatus~~  
~~according to of~~ claim 52 ~~50~~, wherein ~~the further comprising etching gas is replaced with  $\text{Cl}_2$  or a~~  
~~mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is~~  
~~generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added~~  
~~with  $\text{O}_2$~~  the inside of the chamber with the generated plasma such that  $\text{BO}_x$  is removed from the  
inside of the chamber.

57. (Currently amended) A method for ~~plasma etching~~ manufacturing semiconductor  
devices, the method comprising the steps of:

manufacturing a first semiconductor device, the manufacturing including:

performing plasma etching of a conductive film using a gas containing  $\text{BCl}_3$  gas  
as an etching gas in a chamber;

replacing the etching gas in the chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a  
fluorine-based gas after the plasma etching; and

generating in the chamber a plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas before performing plasma etching using a gas that is inhibited from generating plasma by  $\text{BO}_x$  as an etching gas to clean the chamber; and  
manufacturing a second semiconductor device using the cleaned chamber.

58. (Currently amended) A ~~The method for plasma etching according to~~ of claim 57, wherein etching includes etching using a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method ~~is adopted in the plasma etching apparatus.~~

59. (Currently amended) A ~~The method for plasma etching according to~~ of claim 57, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

60. (Currently amended) A ~~The method for plasma etching according to~~ of claim ~~58~~ 57, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate in the chamber during cleaning.

61. (Currently amended) A ~~The method for plasma etching according to~~ of claim 57, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

62. (Currently amended) A ~~The method for plasma etching according to~~ of claim ~~58~~ 57, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  cleaning the chamber includes removing  $\text{BO}_x$  from an inner surface of the chamber.

63. (Currently amended) A ~~The method for plasma etching according to~~ of claim 59 60, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  dummy substrate includes quartz.

64. (Currently amended) A method for ~~plasma etching~~ manufacturing semiconductor devices, the method comprising the steps of:

manufacturing a first semiconductor device, the manufacturing including:

performing plasma etching using a gas containing  $\text{BCl}_3$  gas as an etching gas in a chamber;

replacing the etching gas in the chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas after the plasma etching; and

generating in the chamber plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas to clean the chamber; and

manufacturing a second semiconductor device including performing plasma etching using a gas containing  $\text{SF}_6$  gas as an etching gas.

65. (Currently amended) A ~~The method for plasma etching according to~~ of claim 64, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method ~~is adopted in the plasma etching apparatus.~~

66. (Currently amended) A ~~The method for plasma etching according to~~ of claim 64, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .



67. (Currently amended) A ~~The method for plasma etching according to~~ of claim 65 ~~64,~~  
~~wherein the fluorine-based gas is selected from the group consisting of CF<sub>4</sub>, SF<sub>6</sub> and NF<sub>3</sub> further~~  
~~comprising placing a dummy substrate in the chamber during cleaning.~~

68. (Currently amended) A ~~The method for plasma etching according to~~ of claim 64,  
wherein the etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each  
of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the  
fluorine-based gas each of which is added with O<sub>2</sub>.

69. (Currently amended) A ~~The method for plasma etching according to~~ claim 65 ~~64,~~  
~~wherein the etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each~~  
~~of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the~~  
~~fluorine-based gas each of which is added with O<sub>2</sub> cleaning the chamber includes removing BO<sub>x</sub>~~  
~~from an inner surface of the chamber.~~

70. (Currently amended) A ~~The cleaning method for plasma etching apparatus according~~  
~~to~~ of claim 66 ~~67,~~ wherein the etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a  
fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the  
mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub> dummy substrate  
includes quartz.

71. (Currently amended) A method for ~~plasma etching~~ manufacturing semiconductor  
devices using a plasma etching apparatus including a chamber, said method comprising ~~the steps~~  
of:

manufacturing a first semiconductor device, the manufacturing including:

performing plasma etching using a gas containing BCl<sub>3</sub> as an etching gas in the  
chamber;

replacing the etching gas in the chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas after the plasma etching;

generating in the chamber plasma from  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas to clean the chamber; and

manufacturing a second semiconductor device using the cleaned chamber, the manufacturing including:

performing plasma etching using a gas that is inhibited from generating plasma by  $\text{BO}_x$  as an etching gas,

wherein:

a part of the chamber is made from quartz, and

a surface of the quartz is at least partly exposed to an inside of the chamber, and

generating the plasma includes applying a dielectric magnetic field generated from the electrode through the quartz adjacent the electrode.

72. (Currently amended) A The method for plasma etching according to of claim 71, further comprising etching the inside of the chamber with the generated plasma, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

73. (Currently amended) A The method for plasma etching according to of claim 71, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

74. (Currently amended) A The method for plasma etching according to of claim 72 71, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  placing a dummy substrate within the chamber during cleaning.

75. (Currently amended) A ~~The method for plasma etching according to~~ claim 71, wherein:

replacing the etching gas in the chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas includes replacing the etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas, each of which is added with and O<sub>2</sub>, and

generating the plasma is generated includes generating the plasma from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas, and the each of which is added with O<sub>2</sub>.

76. (Currently amended) A ~~The method for plasma etching according to of~~ claim 72 ~~74~~, wherein the ~~etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub>~~ dummy substrate includes quartz.

77. (Currently amended) A ~~The method for plasma etching according to of~~ claim 74 ~~71~~, wherein the further comprising etching gas is replaced with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas each of which is added with O<sub>2</sub>, and plasma is generated from the Cl<sub>2</sub> or the mixed gas of Cl<sub>2</sub> and the fluorine-based gas each of which is added with O<sub>2</sub> the inside of the chamber with the generated plasma such that BO<sub>x</sub> is removed from an inner surface of the chamber.

78. (Currently amended) A method for ~~plasma etching~~ manufacturing semiconductor devices using a plasma etching apparatus including a chamber, said method comprising the steps of:

manufacturing a first semiconductor device, the manufacturing including:

performing plasma etching using a gas containing BCl<sub>3</sub> as an etching gas in the chamber;

replacing the etching gas in the chamber with Cl<sub>2</sub> or a mixed gas of Cl<sub>2</sub> and a fluorine-based gas after the plasma etching; and

generating in the chamber plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas to clean the chamber; and

manufacturing a second semiconductor device using the cleaned chamber, the manufacturing including:

performing plasma etching in the cleaned chamber using a gas containing  $\text{SF}_6$  gas as etching gas,

wherein:

a part of the chamber is made from quartz, and

a surface of the quartz is at least partly exposed to an inside of the chamber, and

generating the plasma includes applying a dielectric magnetic field generated from the electrode through the quartz adjacent the electrode.

79. (Currently amended) A The method for plasma etching according to of claim 78, further comprising etching the inside of the chamber with the generated plasma, wherein etching includes a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

80. (Currently amended) A The method for plasma etching according to of claim 78, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

81. (Currently amended) A The method for plasma etching according to of claim ~~79~~ 78, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$  further comprising placing a dummy substrate within the chamber while the chamber is being cleaned.

82. (Currently amended) A The method for plasma etching according to of claim 78, wherein:

the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and

the plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$ .

83. (Currently amended) A ~~The method for plasma etching according to~~ of claim 79 81, wherein the ~~etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$~~  dummy substrate includes quartz.

84. (Currently amended) A ~~The method for plasma etching according to~~ of claim 80 78, wherein the further comprising ~~etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$~~  the inside of the chamber with the generated plasma such that  $\text{BO}_x$  is removed from the inside surface of the chamber.

85. (Original) A method for manufacturing a semiconductor device comprising the steps of:

laminating a first conductive film and a second conductive film in sequence over an island shape semiconductor film with a gate insulating film interposed therebetween;

etching the first conductive film and the second conductive film to form a first shape of the first conductive film and a first shape of the second conductive film, respectively, by using a first etching gas;

replacing the first etching gas in a chamber with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas wherein  $\text{BO}_x$  is adhered to an inside of the chamber as a residue; and

generating plasma from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas to remove the  $\text{BO}_x$ ; and

anisotropic etching the first shape of the first conductive film and the first shape of the second conductive film to form a second shape of the first conductive film and a second shape of the second conductive film, respectively.

86. (Original) A method for manufacturing a semiconductor device according to claim 85, wherein a width of the second shape of the first conductive film is longer than that of the second shape of the second conductive film in a channel length direction.

87. (Original) A method for manufacturing a semiconductor device according to claim 85, wherein a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

88. (Original) A method for manufacturing a semiconductor device according to claim 86, wherein a method selected from the group consisting of an RIE etching method, an ICP etching method, an ECR etching method, a helicon wave etching method, a helical resonance etching method and a pulse modulation etching method is adopted in the plasma etching apparatus.

89. (Original) A method for manufacturing a semiconductor device according to claim 85, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

90. (Original) A method for manufacturing a semiconductor device according to claim 86, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

91. (Original) A method for manufacturing a semiconductor device according to claim 87, wherein the fluorine-based gas is selected from the group consisting of  $\text{CF}_4$ ,  $\text{SF}_6$  and  $\text{NF}_3$ .

92. (Original) A method for manufacturing a semiconductor device according to claim 85, wherein an etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas, or  $\text{Cl}_2$  gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  to remove the  $\text{BO}_x$ .

93. (Original) A method for manufacturing a semiconductor device according to claim 86, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  to remove the  $\text{BO}_x$ .

94. (Original) A method for manufacturing a semiconductor device according to claim 87, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  to remove the  $\text{BO}_x$ .

95. (Original) A method for manufacturing a semiconductor device according to claim 89, wherein the etching gas is replaced with  $\text{Cl}_2$  or a mixed gas of  $\text{Cl}_2$  and a fluorine-based gas each of which is added with  $\text{O}_2$ , and plasma is generated from the  $\text{Cl}_2$  or the mixed gas of  $\text{Cl}_2$  and the fluorine-based gas each of which is added with  $\text{O}_2$  to remove the  $\text{BO}_x$ .